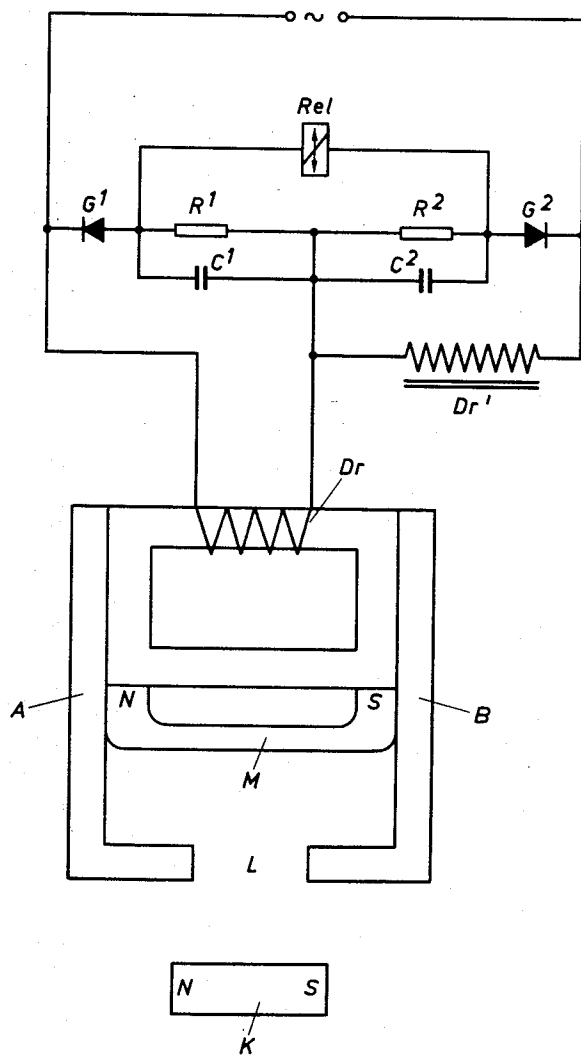


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ARRANGEMENT TO PRODUCE ELECTRICAL SIGNALS
THROUGH AFFECTING A MAGNETIC CIRCUIT
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ARRANGEMENT TO PRODUCE ELECTRICAL SIGNALS THROUGH AFFECTING A MAGNETIC CIRCUIT

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Certain arrangements, in particular railroad safety systems, arrangements to control conveying plants such as pneumatic displace tube systems, devices to count railway cars, and still other arrangements employ a magnetic circuit which is affected by a ferromagnetic body applied to this circuit or moved past it. If this body is displaced into a position in which it is in such a close proximity to the magnetic circuit as to vary the magnetic flux, then certain effects on the circuit can be produced. The magnetic circuit is coupled to electric circuits which in accordance with that influence on the magnetic circuit produce electrical signals by means of suitable switching elements.

The invention concerns arrangements of this type. These employ a choke whose iron core is included in the magnetic circuit while its winding is included in the electric circuit.

Such an arrangement is shown in the accompanying drawing.

The magnetic circuit is constituted by the iron core of the choke *Dr* and by two limbs *A*, *B*. The free ends of these limbs have an air gap *L* between them. If body *K*, magnetized in its longitudinal direction, is moved toward the air gap *L* then the inductance of the choke *Dr* will be varied thereby. Choke *Dr* then constitutes an element of a circuit fed with alternating voltage. The other elements of the circuit are constituted by choke *Dr'* and resistors *R1*, *R2*. These resistors are connected in parallel with condensers *C1*, *C2* and in series with rectifiers *G1*, *G2*. In parallel with the resistors *R1*, *R2* there is arranged the coil of a relay *Rel*. To the outer points of the series-connected chokes *Dr* and *Dr'* there is connected the source of alternating voltage.

This arrangement acts as follows:

At first the inductances of the chokes are the same and the circuit is in the state of equilibrium. The circuit is initially maintained in equilibrium because the alternating current impedance of the chokes *Dr*, *Dr'* remains equal. This impedance is high and alternately negative half-cycles from the source pass through the full wave rectifier network presented by rectifiers *G1*, *G2*. Under these conditions the condensers *C1*, *C2* charge to the same value and there is no potential difference between their junctions and their associated rectifiers sufficient to operate the relay *Rel*. If the magnetic circuit *A*, *Dr*, *B* is affected by the body *K*, the inductance of choke *Dr* varies, whereby the equilibrium of the circuit is disturbed and relay *Rel* hence pulls up. The circuit is unbalanced because the lower impedance of choke *Dr* affects the charging circuit represented by rectifier *G1*, resistor *R1* and condenser *C1*. The voltage across this circuit will be less than the voltage across the corresponding circuit represented by rectifier *G2*, resistor *R2* and condenser *C2*. Condenser *C2* will therefore charge to a higher value than condenser *C1* and a current will flow through the relay *Rel*, and which relay is serially connected to the condensers. Positive half-cycles from the source will

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not flow through the rectifiers *G1*, *G2* but will flow through the series chokes *Dr1*, *Dr'* because their impedance is lower than the high impedance to the positive cycles presented by the rectifiers. If the rectifiers are poled in the opposite direction the system will be operative on the positive half-cycles. The direction of the magnetization of body *K* has no effect on relay *Rel*. This relay pulls up, but where polarized relays are employed, a definite direction of the energy flow in their circuitry can now be obtained from the direction of the magnetization of body *K*.

The invention therefore proposes that the magnetic circuit be given a pre-magnetization. To achieve this, a magnet *M* is included in the magnetic circuit at a suitable place thereof. Preferably, magnet *M* is fitted to the iron core of the choke *Dr*. This magnet may be a permanent magnet or may be excited by means of a direct-current electric field. If now the circuit is restored to its state of equilibrium and the body *K* so displaced as to be near to the air gap *L*, then this body acts to either increase or decrease the magnetic flux. Thereby the equilibrium is disturbed in respect of a definite energy direction and the polarized relay *Rel*, operated by current of a pre-determined direction, acts to produce definite signals.

Thus, in distinction from prior arrangements the inventive circuitry permits of producing different signals by choosing adequately the direction of the flux effective in body *K*. These signals may serve to control routing switches of a transmission path, but also alarm devices and other safety systems as well as counting arrangements may be operated in this way.

While I have described above the principles of my invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation to the scope of my invention as set forth in the objects thereof and in the accompanying claims.

What is claimed is:

1. In an electric signalling device, a source of alternating current, first and second circuits each comprising a rectifier, an inductance and a resistance, means for applying current from said source to said first and second circuits, a polarized load device connected in a third circuit including in series connection said resistances of said first and second circuits, a core of magnetic material associated with said inductance of said first circuit, a permanent magnet member adapted to be moved into proximity with said core to change the equilibrium of said first and second circuits, and means for premagnetizing said core in a predetermined direction whereby said polarized load device will respond only when the magnetic field of said permanent magnet member has a predetermined direction relative to the direction of the field set up in said core by said premagnetizing means.

2. Signalling device according to claim 1, in which said premagnetizing means comprises a permanent magnet attached to said core.

3. Signalling device according to claim 1, in which said core has attached thereto a pair of limbs, the free ends of which form an air gap adapted to be bridged by said permanent magnet member.

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